

CLAIMS

Please cancel claims 7-21 without prejudice and enter new claims 22-36.

1. (Currently amended) A process for cleaning semiconductor fabrication equipment parts comprising:

determining a definition for a clean part including multiple maximum impurity levels;

determining an initial multiple impurity levels of a part prior to its cleaning;

determining a cleaning process to apply to the part;

applying the cleaning process to the part, wherein the cleaning process creates reduced multiple impurity levels for the part below that of said initial multiple impurity levels;

determining said reduced multiple impurity levels;

comparing said reduced multiple impurity levels against said multiple maximum acceptable ~~impurities~~impurity levels of said definition; and

repeating the application of said cleaning process to said part if said reduced multiple impurity levels do not meet said definition of a clean part.

2. (Original) A process as recited in claim 1, further comprising testing the part in reassembled equipment in which the part was designed to operate.

3. (Currently amended) A process as recited in claim 2, further comprising the ~~operation of~~ repeating a cleaning process on the part if the part does not function properly in the reassembled equipment.

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4. (Original) A process as recited in claim 1, wherein at least one impurity level is determined utilizing a surface particle test.
5. (Original) A process of claim 1, wherein at least one impurity level is determined using a liquid particle test.
6. (Original) A process of claim 1, wherein at least one impurity level is determined by using acid-extraction ICP-MS.

Claims 7-21 (Canceled)

22. (New) A process as recited in claim 1 wherein the cleaning process employs a dilute aqueous cleaning solution comprising:

0.5 – 1.5%wt. HF;

0.1 – 0.5%wt. HNO₃; and

1 – 10%wt. H₂O₂.

23. (New) A process as recited in claim 22 wherein the concentration of H₂O₂ is no greater than about 5%wt.

24. (New) A process as recited in claim 1 wherein the cleaning process comprises:
determining how deep is the sub-surface damage beneath a surface of said part;

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chemically etching said surface said part; and

stopping said chemical etching of said surface at about said depth of said sub-surface damage.

25. (New) A process as recited in claim 1 wherein the cleaning process comprises:

performing an ultrasonication cleaning process to a surface of said part to be cleaned;

spray rinsing said part with a dilute chemical mixture; and

spray rinsing said part with deionized water.

26. (New) A process as recited in claim 25 further comprising repeating said spray rinsing of said part with a dilute chemical mixture and spray rinsing said part with deionized water based upon the specification of purity for said part.

27. (New) A process as recited in claim 1 wherein determining said initial impurity level of said part comprises:

introducing said part into a controlled clean environment of at least class 1000;

opening said part in said controlled clean environment; and

running contamination analysis on inner surfaces of said part.

28. (New) A process as recited in claim 27 wherein running contamination analysis includes applying a known volume of ultra pure water to a cavity of said part, extracting said water and analyzing contaminants found in said water.

29. (New) A process as recited in claim 27 wherein running contamination analysis includes applying a known volume of a high purity extraction solution to a cavity of said part, extracting said extraction solution and analyzing contaminants found in said extraction solution.

30. (New) A process as recited in claim 1 wherein the cleaning process used for a ceramic part comprises:

immersing said ceramic part into a first chemical bath to damage contaminant bonds;

heating said ceramic part in a furnace after said contaminant bonds are damaged; and

immersing said ceramic part in a second chemical bath to remove contaminants.

31. (New) A process as recited in claim 30 wherein said first chemical bath is a dilute chemical bath including HF and HNO₃ which is heated to about 60-80°C.

32. (New) A process as recited in claim 1 wherein the cleaning process used for a textured quartz part comprises:

immersing said textured quartz part into an ultrasonic chemical bath;

immersing said textured quartz part into an ultrasonication water bath; and

immersing said textured quartz part into a deionized water bath.

33. (New) A process as recited in claim 1 wherein the cleaning process used for cleaning metallic impurities from a textured ceramic surface of said part comprises:

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immersing said part having the textured ceramic surface into a heated chemical bath;

rinsing said part in deionized water;

immersing said part part in a dilute acid bath and rinsing;

visually inspecting said part; and

repeatedly immersing said part in said dilute acid bath until it passes visual inspection.

34. (New) A process as recited in claim 33 further comprising immersing said part in an ultrasonification overflowing bath.

35. (New) A process as recited in claim 1 wherein determining the definition for said clean part comprises:

testing said part before the cleaning process for at least one of particles, metallic impurities and organics;

testing said part after certain steps in the cleaning process for at least one of particles, metallic impurities and organics; and

testing the part after a final cleaning step of the cleaning process for at least one of particles and organics.

36. (New) A process as recited in claim 1 wherein said cleaning process is used to remove particles on a textured surface of said part and determining said cleaning process comprises:

determining a chemical bonding characteristic of the particles;

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identifying a type of particles embedded in said textured surface;

measuring a depth of any subsurface damage; and

performing a combination of ultrasonification and chemical etching to the textured surface based upon said chemical bonding characteristics, said type of particles and said depth of subsurface damage.